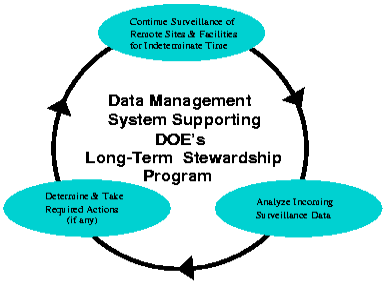
TOADS

Total Online Access Data System

Oak Ridge National Laboratory in partnership with a woman-owned small business, YAHSGS LLC, have developed a conceptual long-term data management and facility modeling system with the potential to reduce EM's S&M costs by $20 - $30 million annually and improve final disposition planning. This conceptual system leverages the Internet and non-proprietary open standards for data acquisition, transmission, and encryption. It provides remotely activated and control led data acquisition and online analysis and reporting customized to individual manage r/user requirements. Oak Ridge National Laboratory and YAHSGS refer to this approach as the *Total Online Access Data System* or TOADS. TOADS will dramatically decrease EM s long-term S&M labor requirements and costs; vastly improve the quality and timelines s (real-time) of reporting, and decrease the cost of final disposition planning. The TOADS concept offers the following benefits and capabilitites:

System/User Benefits



- Minimize human labor requirements in all functional areas.
- Highly user friendly in all aspects of use and operation.
- Fully support EM's S&M, D&D, and ongoing/future cleanup operations.
- Fully support and be compatible with EM final disposition planning activities.
- Automatically evaluate off-normal conditions.
- Automatically initiate proper internal/external responses including checkup requests.
- Provide storage, retrieval, tracking and analysis of facility characterization data.
- Provide visual and spatial images of facilities and associated equipment/wastes.
- Identification and mapping of localized hot spots.
- Generate custom user reports on predetermined frequency on on-demand via Internet.
- Generate and distribute customized reports to EM and regulatory authorities.
- Provide positive ID controls over user permissions.
- Access/control from remote locations via Internet, Intranet, Wireless WEB, cable-line servers.
- Capable of sending/receiving data via PCs, high-end PDAs, telephones, WEB- phones, cable-line devices, and future access devices.

Technical Capabilities

- Capable of receiving input data from photographs, videos, laser range finders, gamma cameras, waste inventories, and computer aided design packages.
- Online analytical processing (OLAP).
- Universally compatible/adaptable with other data systems and applications, Inherent self-learning capability with continuous performance improvement.
- Hot spot tracking capabilities including point & click linkage to visual images.
- Point & click linkage to CAD drawings or other electronic design/layout images.
- Seamlessly accept, store, transfer, archive, and utilize data without loss or corruption.
- Accept data/information from any electronic S&M input device/source.
- Automatically QA/QC all data inputs.
- Automatically update analyses when new data are entered.
- Automatically track and log the status of all S&M instruments/devices.

- Automatically trigger remote electronic calibrations and maintenance "tuning".
- Automated verification of data from instruments and other databases.

The TOADS concept demonstrated the feasibility of the following three technical objectives/challenges:

Objective 1 - ***Being able to reliably transfer data from current EM databases into TOADS without loss or corruption and with minimal human involvement, i.e., non-labor intensive***. Databases have evolved over the course of EMs programs leading to potential incompatibilities between varying datasets due to differing data dictionaries, formats, and software approaches. Moving data between from older databases into current generation database can be very time intensive and expensive, particularly for major sites where data were obtained under multiple protocols, for different purposes, and by multiple contractors over extended time periods as frequently occurs under CERCLA. The TOADS concept requires highly accurate matching of the data fields between the old database(s) and TOADS with internal cross-checking in order to negate the need for highly time intensive and expensive human verification activities. There is a risk that these function s cannot be sufficiently automated to avoid the high human costs.

Objective 2 - ***Being able to reliably obtain and transmit data remotely from the wide variety of current and future S&M instruments; verifying, interpreting, and using raw data for direct use in TOADS; with minimal human involvement***. A major part of the risk is being able to accommodate the range of potential instruments that may be used for S&M purposes. Existing systems (such as provided by Geomation Inc.) work with standard analog sensors and transducers. Next generation systems must also accommodate advanced remote field instruments with more complex outputs, e.g., in situ instruments that detect chemical species, compounds, and oxidation states.

Objective 3 - ***Being able to use remote visual technologies activated by TOADS to supplant/minimize the need for human on-site surveillance, e.g., facility walkthroughs***. Although there are a variety of existing visual systems used for remote surveillance, many involve multiple moving parts and motors that increase their vulnerability to deterioration under uncontrolled field environmental conditions. Those vulnerabilities will invariably lead to high life-cycle costs for maintenance and frequent replacement. Nonetheless, the ability to see what is happening in real-time, as well as to visually record previous conditions, has a strong appeal. The challenge is (a) to put into place and maintain a remote visual capability without the necessity for frequent (annual or more) maintenance visits by humans, and (b) to do so at a reasonable cost. The feasibility of accomplishing this has not been proven. ORNL has been evaluating technologies to overcome the vulnerabilities indicated above. The visual technology will need to have the ability to function under changing environmental conditions, the ability to work properly in a master/slave relationship with other surveillance instruments, and the ability to remotely obtain and transmit images using protocols that would be compatible with TOADS.

Points of Contact:

David Landguth and Robert Coleman
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831-6121
Phone: 865-576-7363
FAX: 865-576-0615
E-mail: landguthdc@ornl.gov
Website: http://dzylinux.ornl.gov

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